

**REMARKS**

Claims 1-26 and 29-32 are pending in this application. Claim 1 is the sole independent claim. By this Amendment, claims 1, 2, 21, and 22 are amended. No new matter is added.

**Rejections Under 35 U.S.C. §103**

Claims 1, 12, 17, 29 and 32 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,635,054 to Girault et al. ("Girault") in view of U.S. Patent Publication 2002/0195345 to Bentsen et al. ("Bentsen"). This rejection is respectfully traversed.

Independent claim 1 is amended to recite "the metal layer being a metal substrate and structured such that metal areas are electrically isolated from one another."

In rejecting claim 1, it is alleged that in Girault the conducting metal 3 is structured such that metal areas are electrically isolated from one another. Applicants disagree. For example, according to Girault, a perforated sheet 2 of non-conducting material coated on one side and a layer of conducting metal 3 on the other side is provided on a substrate 1 (col. 5, lines 10-13). This arrangement is shown in Figs. 1 and 2. As may be clearly seen in Fig. 1, the metal layer 3 is continuous over the surface of the substrate and over the entire area beneath the perforated sheet 2. Although there are gaps (apertures) in the non-conducting sheet 2, the gaps do not go through the metal layer 3 such that the metal layer would have electrically isolated areas.

Girault also discloses that the microarray is made by thick-film printing conducting electrode material (i.e., the alleged metal substrate 3) onto a substrate 1.

A layer of polymer film 2 (i.e., the alleged isolator layer) is then vapor polymerized over the layer 3. As shown in Fig. 3, the conducting material 3 is continuous over the entire substrate 1. Although there are gaps (apertures 4) in the isolator layer 2, there are no gaps which would indicate that the metal layer 3 has metal areas that are electrically isolated from one another (col. 5, lines 34-42). Because Girault fails to disclose or suggest a metal layer being a metal substrate and being structured such that metal areas are electrically isolated from one another, the combination of references fails to disclose or suggest each of the claim features. As such, withdrawal of the rejection is requested.

Claim 1 is further amended to recite “the isolator layer, directly contacting a first surface of the metal substrate, the isolator layer having open spaces formed therein such that the first surface of the metal substrate has exposed areas as sensor surfaces in the isolator layer, wherein the metal substrate includes exposed areas on a second surface facing away from or opposite the first surface, that are contactable with discrete electrodes, the exposed areas each including associated individual measurement electrodes and at least one reference electrode.” In other words, the claimed metal substrate has exposed metal areas on both surfaces.

As clearly shown in Fig. 1 of Girault, for example, the alleged metal substrate 3 has at best exposed areas on only one side (i.e., the side having the isolator layer). The opposite side is fully covered by the substrate 1. Because Girault fails to disclose or suggest a metal substrate that has exposed metal areas on both surfaces, the combination of references fails to disclose or suggest each of the claim features. As such, withdrawal of the rejection is requested.

Bentsen fails to overcome the above deficiencies of Girault. For example, Bentsen discloses a flexible polymeric substrate 12 having metal traces 20 disposed on

a surface thereof (Figs. 1 and 2). Thus, Bentsen does not disclose a metal substrate. Rather, the substrate 12 of Bentsen is a flexible polymeric substrate that may be a polyimide, a poly(methylmethacrylate), polycarbonates, polyolefins, polyamides, polyvinyl chloride, and polytetrafluoroethylene, polyesters, or epoxies. Other ingredients which may be incorporated into the substrate 32 which may include plasticizers, toughening agents, pigments, fillers, stabilizers, antioxidants, flow agents, bodying agents, leveling agents, colorants, binders, fungicides, bactericides, surfactants, glass and ceramic beads, and reinforcing materials such as woven and non-woven webs of organic and inorganic fiber, provided that none of the added ingredients interfere with the chemical or biochemical processes for which the APEX array is intended. Thus, there is no disclosure in Bentsen of a metal substrate as alleged in the Office Action.

Although Bentsen does not disclose or suggest a metal substrate, it is alleged that it would have been obvious to one of skill in the art at the time of the present invention, to modify micro-array electrode of Girault according to the teachings of Bentsen. Specifically, it is alleged that it would have been obvious to “modify the microelectrode array of Girault with the ‘second surface’ connection of Bentsen in order to enable the first surface bearing the exposed electrodes to be directly laminated to a fluid handling architecture that directs the fluid sample to the electrode array, overcome the arduous wire bonding processes and overcome the need to encapsulate the lead wires in protective material as taught by Bentsen (par. 0017).”

According to Bentsen, the electrodes 15 may be connected by metal traces 20 to much larger contact pads 21 located elsewhere on the first or second surface of the flexible polymeric substrate 12 (see paragraph [0017] and Figs. 1 and 2). The “second surface” of the flexible polymeric substrate 12 is identified in the Office Action as

corresponding to the claimed “second surface” of the metal substrate. Thus, as may best be understood from the Office Action it appears that the Examiner states that it would have been obvious to modify the second surface of metal layer 3 of Girault (i.e., the surface not having the isolator layer 2) to include metal traces 20 “to enable the first surface bearing the exposed electrodes to be directly laminated to a fluid handling architecture that directs the fluid sample to the electrode array, overcome the arduous wire bonding processes and overcome the need to encapsulate the lead wires in protective material as taught by Bentsen.”

Applicant respectfully submits that in Girault the surface opposite the isolator layer 2 is a continuous layer of metal that would interconnect the apertures. Thus, adding a metal trace to a metal layer would provide no useful result as it would merely be placing metal on metal. As such, one of skill in the art would not go through the expense and time to add a metal trace to a metal surface. Therefore, there is no rational basis to modify the claim (without relying on hindsight).

Further, it is unclear how adding the metal trace 20 to the metal layer 3 would “enable the first surface to be directly laminated to a fluid handling architecture.” Firstly, the surface of Girault is already metal and as such adding the trace 20 would not “enable” such a lamination in as much as the metal surface would already be so “enabled.”

Moreover, even were metal traces 20 added to the surface of the metal layer 3 opposite the isolator layer 2, such surface would remain covered by the polyester substrate 1 of Girault. As such, even considering *arguendo* that one of skill in the would modify the device of Girault to have metal traces as in Bentsen, such a modification would still not render the claims obvious because the modified

microarray would not have a metal substrate that has exposed metal areas on both surfaces.

Because the combination of references fails to disclose or suggest all of the features recited in the amended claims, withdrawal of the rejection is requested.

Claims 1-21 and 29-32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bentsen in view of Girault. This rejection is respectfully traversed.

In rejecting the claims, it is alleged that Bentsen discloses a metal layer 30 (i.e., the metal traces 34 in the finished product) and that the metal traces 34 correspond to the claimed metal substrate. It is further alleged that the flexible polymeric substrate 32 corresponds to the claimed "isolator layer."

Applicant respectfully reminds the Examiner that such an interpretation of Bentsen is inconsistent with the clear disclosure of the reference. For example, Bentsen consistently describes the "substrate" as the flexible polymeric material upon which the metal traces are deposited. Such usage of the term "substrate" in Bentsen is also consistent with the plain and ordinary meaning of the term. Thus, contrary to the allegation in the Office Action, Bentsen does not disclose a metal substrate.

Applicant again respectfully reminds the Examiner that statements and disclosures in a reference cannot be taken out of context and given meanings they would not have had to one skilled in the art having no knowledge of applicant's invention or to anyone else who can read the specification with understanding.<sup>1</sup> In other words, interpreting the metal traces 34 of Bentsen as a metal substrate is inconsistent with the clear disclosure in the reference of the polymeric substrate 32 and gives a meaning to the metal traces that would not be understood by one reading

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<sup>1</sup> See *In re Wright*, 866 F.2d 422, 426, 9 USPQ2d 1649 (Fed. Cir. 1989).

the specification. For example, according to Bentsen, the substrate is a flexible polymeric substrate 32 that may be a polyimide, a poly(methylmethacrylate), polycarbonates, polyolefins, polyamides, polyvinyl chloride, and polytetrafluoroethylene, polyesters, or epoxies. Other ingredients which may be incorporated into the substrate 32 which may include plasticizers, toughening agents, pigments, fillers, stabilizers, antioxidants, flow agents, bodying agents, leveling agents, colorants, binders, fungicides, bactericides, surfactants, glass and ceramic beads, and reinforcing materials such as woven and non-woven webs of organic and inorganic fiber, provided that none of the added ingredients interfere with the chemical or biochemical processes for which the APEX array is intended. Thus, there is no disclosure in Bentsen of a metal substrate as alleged in the Office Action.

Although the PTO must give claims their broadest reasonable interpretation, this interpretation must be consistent with the one that those skilled in the art would reach.<sup>2</sup> Accordingly, the broadest reasonable interpretation "should not be so broad that it conflicts with the meaning given to identical terms in other patents from analogous art."<sup>3</sup> When properly interpreted, Bentsen fails to disclose or suggest the features as alleged in the Office Action. As such, the combination of references cannot render the claims obvious and the rejection should be withdrawn.

Moreover, claim 1 is amended to recite that the isolator layer, directly contacting a first surface of the metal substrate, the isolator layer having open spaces

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<sup>2</sup> See *In re Morris*, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed.Cir.1997) ("It is axiomatic that, in proceedings before the PTO, claims in an application are to be given their broadest reasonable interpretation consistent with the specification, ... and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art.") (emphasis added); see also M.P.E.P. § 2111.01 ("[T]he words of a claim ... must be read as they would be interpreted by those of ordinary skill in the art."). Prior art references may be "indicative of what all those skilled in the art generally believe a certain term means ... [and] can often help to demonstrate how a disputed term is used by those skilled in the art." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584, 39 USPQ2d 1573, 1578-79 (Fed.Cir.1996).

<sup>3</sup> Cf. *Morris*, 127 F.3d at 1056, 44 USPQ2d at 1029 (approving the board's definition of claim terms consistent with their definitions in CCPA cases), (*In re Cortright*, 165 F.3d 1353, 1358, 49 USPQ2d 1464, (Fed. Cir. 1999).

formed therein such that the first surface of the metal substrate has exposed areas as sensor surfaces in the isolator layer. However, there are no such open spaces in the polymeric layer 32 that would result in the metal trace being exposed on the same side as the layer 32. For example, as clearly shown in Fig. 4E (finished product) the space in the layer 32 is filled such that the trace is not exposed. In fact, in each embodiment of the Bentsen device, the trace is not exposed on the same surface as the flexible polymeric layer. Because Bentsen fails to disclose or suggest the features as provided in the amended claims (including a metal substrate that has exposed metal areas on both surfaces), the combination of references cannot render the claims obvious. As such, withdrawal of the rejection is requested.

Moreover, the references are not combinable for at least the reasons discussed above. As such, withdrawal of the rejection is requested.

Claims 22-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bentsen in view of Girault as applied to claims 1-21 above, and further in view of U.S. Patent Publication 2005/0173246 to Hodges et al. ("Hodges"). This rejection is respectfully traversed.

Claims 22-26 are allowable for their dependency on independent claim 1 for the reasons discussed above, as well as for the additional features recited therein. For example, it is alleged that it would have been obvious to one of skill in the art to modify the sensor of Bentsen (as modified by Girault) "with the working electrode disposed **on the upper surface** and a counter electrode 6 disposed on a **lower surface** of Hodges..."

Applicant respectfully requests clarification of the proposed modification to Bentsen as it is unclear as to what surfaces the electrodes 5 and 6 are to be placed.

In Hodges, the electrodes 5 and 6 form a space for a blood sample. The electrodes are on polymer walls 30. Thus, it is unclear where the electrodes are to be placed on the Bentsen device. According to Fig. 9 of Bentsen, fluid (electrolyte?) 93 is in the space between top and bottom surfaces of the fluid handling architecture 91. Thus, it is unclear what surfaces the electrodes (presumed to be alleged to correspond to the claimed separate metal surface that closes the cavities) would be placed on to close the cavities (fluid space in the fluid handling architecture?).

Because there is no indication of how the proposed modification of Bentsen/Girault is to be provided, no rational basis for combining the references has been articulated that would support the legal conclusion of obviousness. As such, withdrawal of the rejection is requested.

### **CONCLUSION**

In view of the above amendments and remarks, reconsideration of the objections and rejections and allowance of each of the pending claims in connection with the present application is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application the Examiner is respectfully requested to contact the undersigned at the telephone number below.



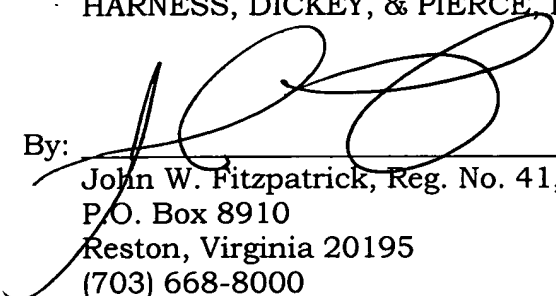
If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. §1.17; particularly, extension of time fees.

Respectfully submitted,

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DJD/JWF:eaf

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